1-2. (Canceled)

3. (Amended) A transmit/receive (T/R) phased array coil system for use with a magnetic resonance imaging (MRI) system having a transmitter and a data acquisition system, the T/R phased array coil system comprising:

(a) a first coil defining a first region;

(b) a second coil defining a second region, said first and said second coils defining an overlap region in which one of said coils is partially overlapped by the other of said coils to form a phased array coil subsystem;

(c) a power splitter for allocating between said first and said second coils radio frequency (RF) power received from said transmitter;

(d) an attenuator for reducing said RF power allocated to at least one of said first and said second coils;

(e) a phase compensator for affecting a phase relationship between (I) a first magnetic field producible through said first coil over said first region corresponding thereto and (II) a second magnetic field producible through said second coil over said second region corresponding thereto; and

(f) a plurality of switches for enabling switching between (I) a transmit state wherein said phased array coil subsystem is coupled to said transmitter and decoupled from said data acquisition system so that a substantially uniform magnetic field is formed [[~~in~~]] in: (A) said overlap region by interaction of said first and said second magnetic [[~~fields~~]] fields; and (B) at least portions of said first and said second regions outside said overlap region predominantly by said first and said second magnetic fields, [[~~respectively,~~]] respectively; thereby enabling said phased array coil subsystem to

apply said substantially uniform magnetic field to an anatomical structure placed within at least one of said first region, said second region and said overlap region; and (II) a receive state wherein said phased array coil subsystem is decoupled from said transmitter and coupled to said data acquisition system thereby enabling a response of said anatomical structure to said substantially uniform magnetic field received by said phased array coil subsystem to be conveyed to said data acquisition subsystem.

4. (Previously Presented) The T/R phased array coil system of claim 3 further comprising a ninety degree element for at least one of said first and said second coils, said ninety degree element operable to:

(a) split said RF power allocated to said coil corresponding thereto into a pair of coil-exciting signals, and

(b) phase-shift one of said coil-exciting signals relative to the other of said coil-exciting signals, with said one of said coil-exciting signals being applied to said coil corresponding thereto at a point ninety degrees apart from the other so that said magnetic field generated therewith, and produced over said region corresponding thereto, is circularly polarized, thereby employing said coil corresponding thereto as a quadrature coil.

5. (Previously Presented) The T/R phased array coil system of claim 3 further comprising a ninety degree element for at least one of said first and said second coils, said ninety degree element operable to:

(a) split said RF power allocated to said coil corresponding thereto into a pair of coil-exciting signals; and

(b) phase-shift one of said coil-exciting signals relative to the other of said coil-exciting signals.

6. (Previously Presented) The T/R phased array coil system of claim 3 wherein at least one of said first and said second coils is a quadrature coil.

7. (Canceled)

8. (Previously Presented) The T/R phased array coil system of claim 3 wherein said first and said second coils each detect said response as a magnetic resonance signal of a portion of said anatomical structure covered thereby, with said magnetic resonance signals of each of said coils being conveyed to a separate processing port of said data acquisition system.

9. (Previously Presented) The T/R phased array coil system of claim 3 wherein at least one of said first and said second coils detects said response as quadrature components of a magnetic resonance signal of a portion of said anatomical structure covered thereby, with said quadrature components of each of said coils being conveyed to a separate processing port of said data acquisition system.

10. (Previously Presented) The T/R phased array coil system of claim 3 wherein:

(a) in said transmit state, said plurality of switches (A) couple said phased array coil subsystem to a transmit port of said transmitter and (B) decouple said phased array coil subsystem from processing ports of said data acquisition system; and

(b) in said receive state, said plurality of switches (A) decouple said phased array coil subsystem from said transmit port of said transmitter and (B) couple said phased array coil subsystem to said processing ports of said data acquisition system.

11. (Previously Presented) The T/R phased array coil system of claim 3 wherein said plurality of switches are PIN diodes.

12. (Previously Presented) The T/R phased array coil system of claim 3 wherein at least one of said first and said second coils is a volume coil.

13. (Previously Presented) A transmit/receive (T/R) phased array coil system for use with a magnetic resonance imaging (MRI) system having a transmitter and a data acquisition system, the T/R phased array coil system comprising:

(a) a first volume coil defining a first region;

(b) a second volume coil defining a second region, said first and said second volume coils defining an overlap region in which one of said volume coils is partially disposed within the other of said volume coils to form a phased array coil subsystem; and

(c) an interface subsystem operably coupled to said phased array coil subsystem, said interface subsystem comprising:

(I) a power splitter for allocating between said first and said second volume coils radio frequency (RF) power received from said transmitter;

(II) a phase compensator for affecting a phase relationship between (A) a first magnetic field producible through said first volume coil over said first region corresponding thereto and (B) a second magnetic field producible through said second volume coil over said second region corresponding thereto; and

(III) a plurality of switches for enabling said interface subsystem to be switched between (A) a transmit state wherein said phased array coil subsystem is coupled to said transmitter and decoupled from said data acquisition system so that a substantially uniform magnetic field is formed over (1) said overlap region by interaction of said first and said second magnetic fields and (2) at least portions of said first and said second regions outside said overlap region predominantly by said first and said second magnetic fields, respectively, thereby enabling said phased array coil subsystem to apply said substantially uniform magnetic field to an anatomical structure placed within at least one of said first, said second and said overlap regions; and (B) a receive state wherein said phased array coil subsystem is decoupled from said transmitter and coupled to said data acquisition system thereby enabling a response of said anatomical structure to said substantially uniform magnetic field to be conveyed through said phased array coil subsystem to said data acquisition subsystem.

14. (Previously Presented) The T/R phased array coil system of claim 13 wherein said interface subsystem further includes an attenuator for reducing said RF power allocated to at least one of said first and said second volume coils.

15. (Previously Presented) The T/R phased array coil system of claim 13 wherein said interface subsystem further comprises a ninety degree element for at least one of said first and said second volume coils, said ninety degree element operable to:

(a) split said RF power allocated to said volume coil corresponding thereto into a pair of coil-exciting signals, and

(b) phase-shift one of said coil-exciting signals relative to the other of said coil-exciting signals, with said one of said coil-exciting signals being applied to said volume coil corresponding thereto at a point ninety degrees apart from the other so that said magnetic field generated therewith, and produced over said region corresponding thereto, is circularly polarized, thereby employing said volume coil corresponding thereto as a quadrature coil.

16. (Previously Presented) The T/R phased array coil system of claim 13 wherein said interface subsystem further comprises a ninety degree element for at least one of said first and said second volume coils, said ninety degree element operable to:

(a) split said RF power allocated to said volume coil corresponding thereto into a pair of coil-exciting signals; and

(b) phase-shift one of said coil-exciting signals relative to the other of said coil-exciting signals.

17. (Previously Presented) The T/R phased array coil system of claim 13 wherein at least one of said first and said second volume coils is a quadrature coil.

18. (Canceled)

19. (Previously Presented) The T/R phased array coil system of claim 13 wherein said first and said second volume coils each detect said response as a magnetic resonance signal of a portion of said anatomical structure covered thereby, with said magnetic resonance signals of each of said volume coils being conveyed to a separate image processing port of said data acquisition system.

20. (Previously Presented) The T/R phased array coil system of claim 13 wherein at least one of said first and said second volume coils detects said response as quadrature components of a magnetic resonance signal of a portion of said anatomical structure covered thereby, with said quadrature components of each of said volume coils being conveyed to a separate image processing port of said data acquisition system.

21. (Previously Presented) The T/R phased array coil system of claim 13 wherein:

(a) in said transmit state, said plurality of switches (A) couple said phased array coil subsystem to a transmit port of said transmitter and (B) decouple said phased array coil subsystem from image processing ports of said data acquisition system; and

(b) in said receive state, said plurality of switches (A) decouple said phased array coil subsystem from said transmit port of said transmitter and (B) couple said phased array coil subsystem to said image processing ports of said data acquisition system.

22. (Previously Presented) The T/R phased array coil system of claim 13 wherein said plurality of switches are PIN diodes.

23. (Previously Presented) A transmit/receive (T/R) phased array coil system for use with a magnetic resonance imaging (MRI) system, the T/R phased array coil system comprising:

(a) a first coil covering a first region;

(b) a second coil covering a second region, said first and said second coils defining an overlap region in which one of said coils is partially overlapped by the other of said coils to form a phased array coil subsystem; and

(c) an interface subsystem connected to said phased array coil subsystem, said interface subsystem comprising a power splitter, an attenuator, a phase compensator, and a plurality of switches for enabling said interface subsystem to be switched between:

(I) a transmit state wherein (A) said power splitter allocates radio frequency (RF) power received from said MRI system between said first and said second coils with said attenuator reducing said RF power directed to at least one of said first and said second coils so that (i) a first magnetic field is applied through said first coil to said first region corresponding thereto and (ii) a second magnetic field is applied through said second coil to said second region corresponding thereto and (B) said phase compensator affects a phase relationship between said first and said second magnetic fields so as to cause a resultant magnetic field of substantial uniformity to be formed not only in (i) at least portions of said first and said second regions outside said overlap region predominantly by said first and said second magnetic fields, respectively, but also in (ii) said overlap region by interaction of said first and said

second magnetic fields, thereby enabling said phased array coil subsystem to apply said resultant magnetic field to an anatomical structure placed within at least one of said first region, said second region and said overlap region; and

(II) a receive state wherein said interface subsystem receives from said phased array coil subsystem a response of said anatomical structure to said resultant magnetic field and conveys said response to said MRI system.

24. (Previously Presented) The T/R phased array coil system of claim 23 wherein at least one of said first and said second coils is a volume coil.

25. (Previously Presented) The T/R phased array coil system of claim 23 wherein said interface subsystem further comprises a ninety degree element for at least one of said first and said second coils, said ninety degree element operable to:

(a) split said RF power allocated to said coil corresponding thereto into a pair of coil-exciting signals, and

(b) phase-shift one of said coil-exciting signals relative to the other of said coil-exciting signals, with said one of said coil-exciting signals being applied to said coil corresponding thereto at a point ninety degrees apart from the other so that said magnetic field generated therewith, and produced over said region corresponding thereto, is circularly polarized, thereby employing said coil corresponding thereto as a quadrature coil.

26. (Previously Presented) The T/R phased array coil system of claim 23 wherein said interface subsystem further comprises a ninety degree element for at least one of said first and said second coils, said ninety degree element operable to:

(a) split said RF power allocated to said coil corresponding thereto into a pair of coil-exciting signals; and

(b) phase-shift one of said coil-exciting signals relative to the other of said coil-exciting signals.

27. (Previously Presented) The T/R phased array coil system of claim 23 wherein at least one of said first and said second coils is a quadrature coil.

28. (Canceled)

29. (Previously Presented) The T/R phased array coil system of claim 23 wherein said first and said second coils each detect said response as a magnetic resonance signal of a portion of said anatomical structure covered thereby, with said magnetic resonance signals of each of said coils being conveyed to a separate processing port of a data acquisition system of said MRI system.

30. (Previously Presented) The T/R phased array coil system of claim 23 wherein at least one of said first and said second coils detects said response as quadrature components of a magnetic resonance signal of a portion of said anatomical structure covered thereby, with said quadrature

components of each of said coils being conveyed to a separate processing port of a data acquisition system of said MRI system.

31. (Amended) The T/R phased array coil system of claim 23 wherein:

(a) in said transmit state, said plurality of switches (A) couple said phased array coil subsystem to a transmit port of said MRI system ~~transmitter~~ and (B) decouple said phased array coil subsystem from processing ports of a data acquisition system of said MRI system; and

(b) in said receive state, said plurality of switches (A) decouple said phased array coil subsystem from said transmit port of said MRI system ~~transmitter~~ and (B) couple said phased array coil subsystem to said processing ports of said data acquisition system.

32. (Previously Presented) The T/R phased array coil system of claim 23 wherein said plurality of switches are PIN diodes.

33. (Previously Presented) A transmit/receive (T/R) phased array coil system for use with a magnetic resonance imaging (MRI) system, the T/R phased array coil system comprising:

(a) a first coil covering a first region;

(b) a second coil covering a second region, said first and said second coils defining an overlap region in which one of said coils is partially overlapped by the other of said coils to form a phased array coil subsystem; and

(c) an interface subsystem connected to said phased array coil subsystem, said interface subsystem comprising a power splitter, an attenuator, a phase compensator, and a plurality of switches for enabling said interface subsystem to be switched between:

(I) a transmit state wherein said power splitter allocates radio frequency (RF) power received from said MRI system between said first and said second coils with said attenuator reducing said RF power directed to at least one of said first and said second coils so that (A) a first magnetic field is applied through said first coil to said first region corresponding thereto and (B) a second magnetic field is applied through said second coil to said second region corresponding thereto with said phase compensator affecting a phase relationship between said first and said second magnetic fields so as to cause a resultant magnetic field to be substantially uniform not only over at least portions of said first and said second regions outside said overlap region but also over said overlap region by interaction of said first and said second magnetic fields, thereby enabling said phased array coil subsystem to apply said resultant magnetic field to an anatomical structure placed within at least one of said first region, said second region and said overlap region; and

(II) a receive state wherein said interface subsystem receives from said phased array coil subsystem a response of said anatomical structure to said resultant magnetic field and conveys said response to said MRI system.

34. (Previously Presented) The T/R phased array coil system of claim 33 wherein at least one of said first and said second coils is a volume coil.

35. (Previously Presented) The T/R phased array coil system of claim 33 wherein said attenuator is connected between said splitter and a smaller of said first and said second coils.

36. (Previously Presented) The T/R phased array coil system of claim 35 wherein said interface subsystem further comprises a first ninety degree element connected between said attenuator and said smaller of said first and said second coils.

37. (Previously Presented) The T/R phased array coil system of claim 35 wherein said phase compensator is connected between said splitter and a larger of said first and said second coils, and said interface subsystem further comprises a second ninety degree element connected between said phase compensator and said larger of said first and said second coils.

38. (Previously Presented) The T/R phased array coil system of claim 33 wherein at least one of said first and said second coils is a quadrature coil.

39. (Canceled)

40. (Previously Presented) The T/R phased array coil system of claim 33 wherein said first and said second coils each detect said response as a magnetic resonance signal of a portion of said anatomical structure covered thereby, with said magnetic resonance signals of each of said coils being conveyed to a separate image processing port of a data acquisition system of said MRI system.

41. (Previously Presented) The T/R phased array coil system of claim 33 wherein at least one of said first and said second coils detects said response as quadrature components of a magnetic resonance signal of a portion of said anatomical structure covered thereby, with said quadrature components of each of said coils being conveyed to a separate image processing port of a data acquisition system of said MRI system.

42. (Amended) The T/R phased array coil system of claim 33 wherein:

(a) in said transmit state, said plurality of switches (A) couple said phased array coil subsystem to a transmit port of said MRI system ~~transmitter~~ and (B) decouple said phased array coil subsystem from image processing ports of a data acquisition system of said MRI system; and

(b) in said receive state, said plurality of switches (A) decouple said phased array coil subsystem from said transmit port of said MRI system ~~transmitter~~ and (B) couple said phased array coil subsystem to said image processing ports of said data acquisition system.

43. (Previously Presented) The T/R phased array coil system of claim 33 wherein said plurality of switches are PIN diodes.

44. (Previously Presented) A transmit/receive (T/R) phased array coil system for use with a magnetic resonance imaging (MRI) system, the T/R phased array coil system comprising:

(a) a first birdcage coil encompassing a first region;

(b) a second birdcage coil encompassing a second region, said first and said second birdcage coils defining an overlap region in which one of said birdcage coils is partially overlapped by the other of said birdcage coils to form a phased array coil subsystem; and

(c) an interface subsystem connected to said phased array coil subsystem, said interface subsystem comprising a power splitter, an attenuator, a phase compensator, and a plurality of switches for enabling said interface subsystem to be switched between:

(I) a transmit state wherein said power splitter allocates radio frequency (RF) power received from said MRI system between said first and said second birdcage coils with said attenuator reducing said RF power directed to at least one of said first and said second birdcage coils so that (A) a first magnetic field is applied through said first birdcage coil to said first region encompassed thereby and (B) a second magnetic field is applied through said second birdcage coil to said second region encompassed thereby with said phase compensator affecting a phase relationship between said first and said second magnetic fields so as to cause a resultant magnetic field to be substantially uniform not only over at least portions of said first and said second regions outside said overlap region but also over said overlap region by interaction of said first and said second magnetic fields, thereby enabling said phased array coil subsystem to apply said resultant magnetic field to an anatomical structure placed within at least one of said first region, said second region and said overlap region; and

(II) a receive state wherein said interface subsystem receives from said phased array coil subsystem a response of said anatomical structure to said resultant magnetic field and conveys said response to said MRI system.

45. (Previously Presented) The T/R phased array coil system of claim 44 wherein said attenuator is connected between said splitter and a smaller of said first and said second birdcage coils.

46. (Previously Presented) The T/R phased array coil system of claim 45 wherein said interface subsystem further comprises a first ninety degree element connected between said attenuator and said smaller of said first and said second birdcage coils.

47. (Previously Presented) The T/R phased array coil system of claim 45 wherein said phase compensator is connected between said splitter and a larger of said first and said second birdcage coils, and said interface subsystem further comprises a second ninety degree element connected between said phase compensator and said larger of said first and said second birdcage coils.

48. (Previously Presented) The T/R phased array coil system of claim 44 wherein at least one of said first and said second birdcage coils is a quadrature coil.

49. (Previously Presented) The T/R phased array coil system of claim 44 wherein said first and said second birdcage coils each detect said response as a magnetic resonance signal of a portion of said anatomical structure covered thereby, with said magnetic resonance signals of each of said birdcage coils being conveyed to a separate image processing port of a data acquisition system of said MRI system.

50. (Previously Presented) The T/R phased array coil system of claim 44 wherein at least one of said first and said second birdcage coils detects said response as quadrature components of a magnetic resonance signal of a portion of said anatomical structure covered thereby, with said quadrature components of each of said birdcage coils being conveyed to a separate image processing port of a data acquisition system of said MRI system.

51. (Amended) The T/R phased array coil system of claim 44 wherein:

(a) in said transmit state, said plurality of switches (A) couple said phased array coil subsystem to a transmit port of said MRI system ~~transmitter~~ and (B) decouple said phased array coil subsystem from image processing ports of a data acquisition system of said MRI system; and

(b) in said receive state, said plurality of switches (A) decouple said phased array coil subsystem from said transmit port of said MRI system ~~transmitter~~ and (B) couple said phased array coil subsystem to said image processing ports of said data acquisition system.

52. (Previously Presented) The T/R phased array coil system of claim 44 wherein said plurality of switches are PIN diodes.

53. (Previously Presented) A transmit/receive (T/R) phased array coil system for use with a magnetic resonance (MR) system, the T/R phased array coil system comprising:

(a) a first coil covering a first region;

(b) a second coil covering a second region, said first and said second coils defining an overlap region in which one of said coils is partially overlapped by the other of said coils to form a phased array coil subsystem; and

(c) an interface subsystem operably connected to said phased array coil subsystem, said interface subsystem capable of being switched between (I) a transmit state wherein a resultant magnetic field of substantial uniformity is generated not only over said first and said second regions, but also over said overlap region by interaction of first and second magnetic fields set up through said first and said second coils, respectively; and (II) a receive state wherein said interface subsystem receives a response of an anatomical structure placed within said phased array coil subsystem to said resultant RF magnetic field and conveys said response to said MR system.

54. (New) A phased array coil system for use with a magnetic resonance system, the phased array coil system comprising:

(a) a first coil defining a first region;

(b) a second coil defining a second region, the first coil partially overlapping the second coil to define an overlap region formed by the intersection of the first and second regions; and

(c) an interface subsystem operably connected with the first and second coils, the interface subsystem comprising (i) a power splitter for splitting radio frequency (RF) power for delivery to the first and second coils and (ii) a phase compensator for adjusting the phase relationship of the RF power delivered to the first and second coils so that a magnetic field produced thereby in the overlap region is approximately equal to that produced near the center of each of the first and second regions.

55. (New) The phased array coil system of claim 54 wherein each of the first and second coils is a birdcage coil.

56. (New) The phased array coil system of claim 55 wherein the interface subsystem further includes an attenuator for reducing the RF power allocated to a smaller of the first and second birdcage coils.

57. (New) The phased array coil system of claim 56 wherein at least one of the first and second birdcage coils is a quadrature coil.

58. (New) A phased array coil system for use with a magnetic resonance system, the phased array coil system comprising:

(a) a first coil defining a first region;

(b) a second coil defining a second region, the first coil partially overlapping the second coil to define an overlap region formed by the intersection of the first and second regions; and

(c) an interface subsystem operably connected with the first and second coils, the interface subsystem comprising (i) a power splitter for splitting radio frequency (RF) power for delivery to the first and second coils and (ii) a phase compensator for adjusting the phase relationship of the RF power delivered to the first and second coils to cause partial destructive/constructive interference thereof in the overlap region so that a magnetic field produced thereby in the overlap region is approximately equal to that produced near the center of each of the first and second regions.

59. (New) The phased array coil system of claim 58 wherein each of the first and second coils is a volume coil.

60. (New) The phased array coil system of claim 58 wherein each of the first and second coils is a birdcage coil.

61. (New) The phased array coil system of claim 60 wherein the power splitter splits the RF power for delivery to the first and second birdcage coils to produce first and second magnetic fields in the first and second regions, respectively.

62. (New) The phased array coil system of claim 61 wherein the phase compensator adjusts the phase relationship between the first and second magnetic fields to cause partial destructive/constructive interference thereof in the overlap region so that the magnitude of the resulting magnetic field produced thereby in the overlap region is approximately equal to the magnitude of the first and second magnetic fields near the center of each of the first and second regions, respectively.

63. (New) The phased array coil system of claim 62 wherein the interface subsystem further includes an attenuator for reducing the RF power allocated to a smaller of the first and second birdcage coils.

64. (New) A transmit/receive (T/R) phased array coil system for use with a magnetic resonance imaging (MRI) system, the T/R phased array coil system comprising:

(a) a first birdcage coil encompassing a first region;

(b) a second birdcage coil encompassing a second region, the first and second birdcage coils defining an overlap region in which one of the birdcage coils is partially overlapped by the other of the birdcage coils to form a phased array coil subsystem; and

(c) an interface subsystem connected to the phased array coil subsystem, the interface subsystem comprising a power splitter, an attenuator, a phase compensator, and a plurality of switches for enabling the interface subsystem to be switched between:

(I) a transmit state wherein the power splitter allocates radio frequency (RF) power received from the MRI system between the first and second birdcage coils with the attenuator reducing the RF power directed to at least one of the first and second birdcage coils so that (A) a first magnetic field is applied through the first birdcage coil to the first region encompassed thereby and (B) a second magnetic field is applied through the second birdcage coil to the second region encompassed thereby with the phase compensator affecting a phase relationship between the first and second magnetic fields so that a resulting magnetic field produced thereby in the overlap region is approximately equal to the first and second magnetic fields produced near the center of the first and second regions, respectively; and

(II) a receive state wherein the interface subsystem receives from the phased array coil subsystem a response of an anatomical structure placed therein and conveys the response to the MRI system.

65. (New) The T/R phased array coil system of claim 64 wherein the phase compensator adjusts the phase relationship between the first and second magnetic fields to cause partial destructive/constructive interference thereof in the overlap region so that the magnitude of the resulting magnetic field produced thereby in the overlap region is approximately equal to the magnitude of the first and second magnetic fields near the center of each of the first and second regions, respectively.

66. (New) The T/R phased array coil system of claim 64 wherein at least one of said first and said second birdcage coils is a quadrature coil.